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TERMINOLOGY OF STENTERS

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TERMINOLOGY OF STENTERS

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Indian Standard
TERMINOLOGY OF STENTERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 13 March 1981, after the draft finalized by the Dyeing and Finishing Machinery Sectional Committee had been approved by the Textile Division Council.

0.2 This standard has been prepared with a view to eliminating ambiguity and confusion arising from local interpretations of terms relating to stenters.

0.3 In the formulation of this standard, due weightage has been given to the international coordination among the standards and practices prevailing in different countries. This standard is based on ISO/DIS 5250 'Textile Machinery and Accessories — Dyeing and Finishing Machinery — Terminology for Stenters', issued by the International Organization for Standardization.

1. SCOPE

1.1 This standard gives an illustrated nomenclature of the stenters used in textile finishing industry (bleaching, dyeing, printing and finishing) for thermal treatment of fabric with maintenance of width and adjustment of the latter, if necessary.

1.2 The terms used are classified under the following headings:

a) Types of stenter,

b) Machine features,

c) Designation of side and indication of dimensions, and

d) Elements of construction.

2. TYPES OF STENTER

2.1 Stretching (Equalizing) Stenter — Chamberless machine used to stretch fabric presented in open width. The chains constituting tension device for width adjustment can be in a horizontal plane (*see* **3.1.1**) or vertical plane (*see* **3.1.2**).

Figure 1 shows an equalizing stenter with a horizontal return chain tension device (*see* **3.1.1**).

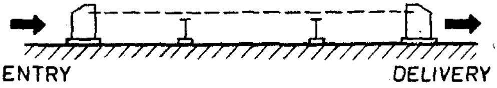

FIG. 1 TYPICAL EQUILISING STENTER

2.2 Single-Layer Stenter — Machines with chambers used to stretch or equalize fabric width and to treat fabric presented in open width in forward passage through dyeing/thermal treatment zone.

The fabric conveying chain constituting width adjusting device can be in an horizontal plane (*see* **3.1.1**) or in a vertical plane (*see* **3.1.2**).

The direction of impinging air is either parallel (*see* **3.2.1**) or perpendicular (*see* **3.2.2**) to the fabric surface.

Figure 2 shows a single-layer horizontal return stenter (*see* **3.1.1**).

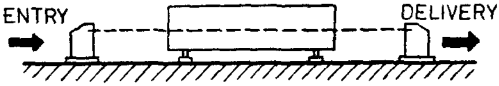

FIG. 2 SINGLE-LAYER HORIZONTAL RETURN STENTER

2.3 Double-Layer Stenter — Machine used to stretch or equalize the fabric width and to treat the fabric presented in open width on one forward and one return pass through the stenter (*see* Fig. 3). Chains constituting width adjustment device move in a vertical plane (*see* **3.1.2**). The direction of impinging air is either parallel (*see* **3.2.1**) or perpendicular (*see* **3.2.2**) to fabric.

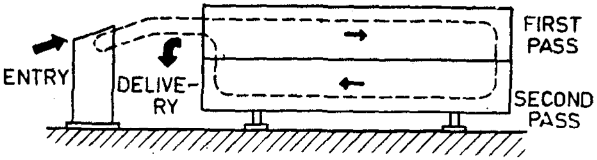

FIG. 3 DOUBLE-LAYER STENTER

2.4 Multi-stage Stenter — Machine used to stretch or equalize the fabric width and to treat the fabric presented in open width on several forward and return passes through the thermal treatment zone. The chains constituting width adjustment device move in a vertical plane (*see* **3.1.2**). The direction of the impinging air is either parallel (*see* **3.2.1**) or perpendicular (*see* **3.2.2**) to the fabric.

Figure 4 shows a four-layer stenter (four passes).

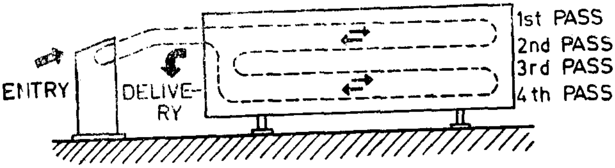

FIG. 4 FOUR-LAYER STENTER

3. MACHINE FEATURES

3.1 Chain Arrangement

3.1.1 *Horizontal* — Arrangement in which forward and return of the fabric conveying chain on both sides (left and right) is in a horizontal plane as that of the fabric forward passage (*see* Fig. 5).

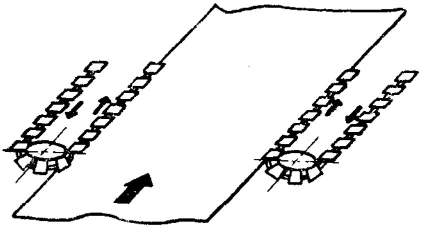

FIG. 5 HORIZONTAL CHAIN ARRANGEMENT

3.1.2 *Vertical* — Arrangement in which forward and return paths of two chains are in vertical plane perpendicular to the fabric forward passage (*see* Fig. 6).

3.2 Direction of Impinging Air

3.2.1 *Parallel to the Fabric* — Air is blown in a plane parallel to that of the fabric (laterally or longitudinally) (*see* Fig. 7).

3.2.2 *Perpendicular to the Fabric* — Air is blown perpendicularly onto the plan of the fabric either from above or below or above and below simultaneously (*see* Fig. 8).

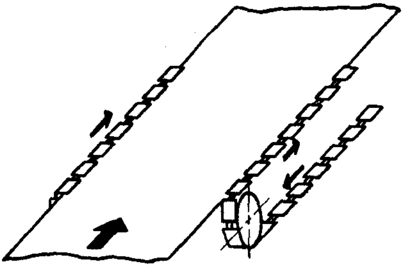

FIG. 6 VERTICAL CHAIN ARRANGEMENT

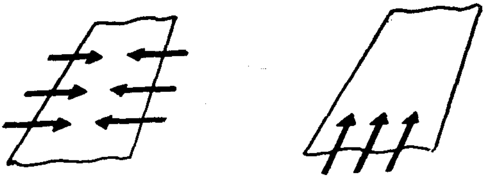

FIG. 7 IMPINGING AIR PARALLEL TO THE FABRIC

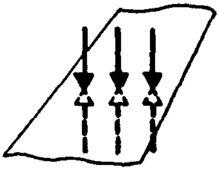

FIG. 8 IMPINGING AIR PERPENDICULAR TO THE FABRIC

4. DESIGNATION OF SIDE AND INDICATION OF DIMENSIONS

4.1 Designation of Side (*see* Fig. 9).

4.1.1 *Right Hand Side* — The side which is on right hand when seen from the cloth feeding end.

4.1.2 *Left Hand Side* — The side which is on left hand when seen from cloth feeding end.

NOTE — The definition of right and left sides is intended to allow the designation without ambiguity of position of various parts.

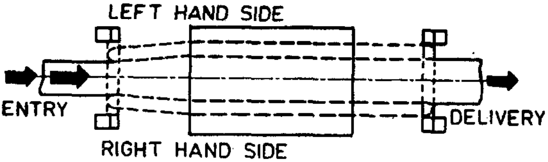

FIG. 9 DESIGNATION OF SIDE

4.2 Indication of Length (*see* Fig. 10).

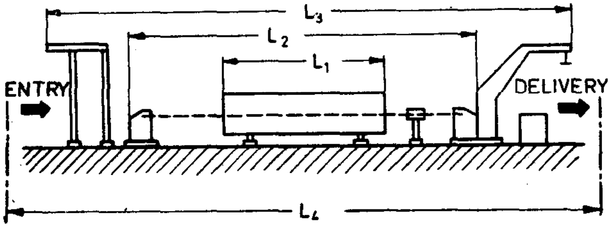

FIG. 10 INDICATION OF LENGTH

4.2.1 *Length of Chamber* (L_1) — Length of thermal zone(s) of the stenter.

4.2.2 *Length of Stenter* (L_2) — Overall length of the stenter inclusive of entry and exit zones of the machine but not including any device or element added to entry and exit zones.

4.2.3 *Length of Machine* (L_3) — Overall length including additional accessories, devices or elements added to entry and exit zones.

4.2.4 *Length of Installation* (L_4) — Total length of the stenter inclusive of additional devices or elements added to entry and exit zones of the machine and also the minimum operational length required at entry and exit of the machine.

4.3 Indication of Width (*see* Fig. 11).

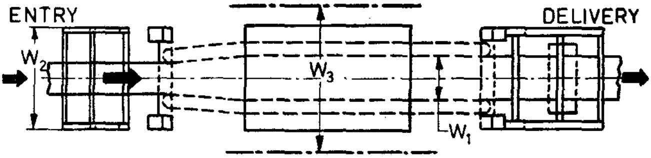

FIG. 11 INDICATION OF WIDTH

4.3.1 *Width of the Stenter* (W_1) — Maximum effective width of the fabric that can be treated on the stenter either on pins or clips whichever is less.

NOTE — Width of the stenter is also termed as nominal width or working width.

4.3.2 *Total Width* (W_2) — Maximum width at any point of the machine including additional devices and elements.

4.3.3 *Installation Width* (W_3) — Total width of space necessary for operation and maintenance of machine.

4.4 Indication of Height (*see* Fig. 12)

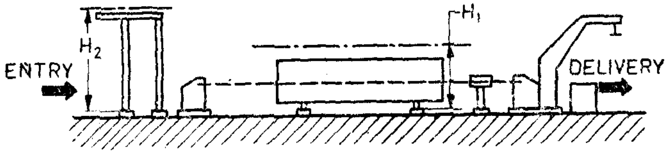

FIG. 12 INDICATION OF HEIGHT

4.4.1 *Height of Chamber* (H_1) — Height of the thermal zone(s) of the stenter.

4.4.2 *Height of Installation* (H_2) — Maximum height of stenter including the height of additional devices or elements added to entry or exit zones of machine and additional space required for operation and maintenance of the machine.

5. ELEMENTS OF CONSTRUCTION

5.1 Division of the Stenter into Zones (*see* Fig. 13)

5.1.1 *Feeding Zone* (*A*) — Part of the stenter in which fabric is secured in pins or clips.

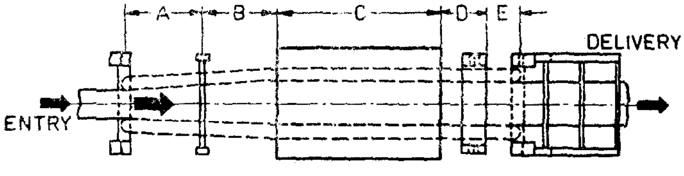

FIG. 13 DIVISION OF STENTER INTO ZONES

5.1.2 *Intermediate Zone* (*B*) — Part of the stenter located between feeding zone (*see* **5.1.1**) and thermal treatment zone (*see* **5.1.3**) where fabric is subjected to width adjustment.

5.1.3 *Thermal Treatment Zone* (*C*) — Part of stenter where fabric is subjected to thermal treatment.

5.1.3.1 *Drying zone* — Part of the thermal treatment zone in which fabric during its passage is relieved of its excess moisture.

5.1.3.2 *Setting zones* — Part of thermal treatment zone permitting attainment of the necessary treatment temperatures for setting textile material or fixing dyes or finishes.

5.1.4 *Cooling Zone* (*D*) — Part of stenter between thermal treatment zone (*see* **5.1.3**) and delivery zone (*see* **5.1.5**). The fabric is subjected to forced cooling in this zone.

5.1.5 *Delivery Zone* (*E*) — Part of the stenter in which fabric is released.

5.2 Stenter Chain Assembly — Endless stenter chain assembly with necessary fabric gripping system, one on each side of the stenter.

5.2.1 *Chain Link Upper Part with Pins* — Piece of stenter chain (*see* **5.2**) used to take fabric by pinning the selvedges of that fabric (*see* Fig. 14).

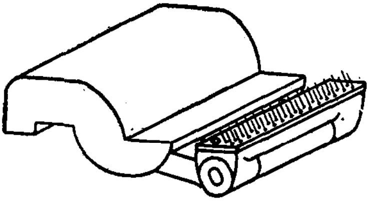

FIG. 14 CHAIN LINK UPPER PART WITH PINS

5 2.1.1 *Pin plate* — Active part of chain link designed to take selvedges of fabric on pins (*see* Fig. 15). The pins may be distributed in one or several rows.

5.2.1.1.1 Pin plate with smooth pins (without ribs).

5.2.1.1.2 Pin plate with ribbed pins (moulded pins).

5.2.1.1.3 Pin plate with hooked pins.

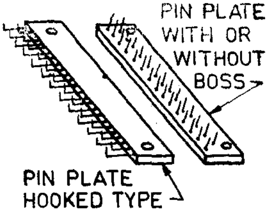

FIG. 15 PIN PLATE

5.2.2 *Chain Link Upper Part with Clip* — Piece of the stenter chain (*see* **5.2**) used to take fabric by gripping selvedge of fabric (*see* Fig. 16).

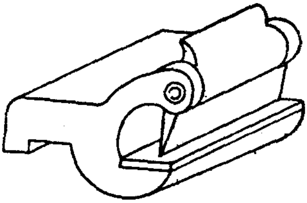

FIG. 16 CHAIN LINK UPPER PART WITH CLIP

5.2.2.1 *Clip* — Active part of the chain link responsible for gripping the selvedges of the fabric.

5.2.2.1.1 *Hammer clip* — Device designed to hold the selvedges of fabric, principally for vertically guided chains (*see* Fig. 17).

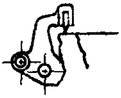

FIG. 17 HAMMER CLIP

5.2.2.1.2 *Wobbler clip* — Device designed to take selvedges of fabric, principally for horizontally guided chains.

Wobbler clip may be of the following types:

a) Friction roller,

b) Light pressure (for light weight and delicate fabrics), and

c) Heavier pressure (for production on mercerizing and coating machines).

5.2.3 *Chain Link Upper Part with Combined System of Pins and Clip* — Piece of stenter chain (*see* **5.2**) combining functions of pins and clips (*see* Fig. 18).

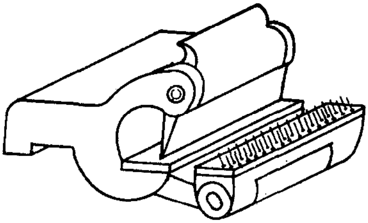

FIG. 18 CHAIN LINK UPPER PART WITH COMBINED SYSTEM OF PINS AND CLIP

5.3 Width Adjustment Device

5.3.1 *Device for Adjustment of Width in Feed Zone* — Device in feed zone by means of which chain individually adapts itself to variations in fabric position by a special detection component.

5.3.1.1 *Additional width adjustment device* — Device for adjusting width of fabric at specific point over and above standard width control arrangement.

5.3.2 *Device for Adjustment of Width in Intermediate Zone and Possibly in Thermal Treatment Zone* — Device in intermediate zone and possibly in thermal treatment zone which permits adjustment of fabric to desired width.

5.3.2.1 *Device for additional adjustment of width in intermediate zone and possibly in thermal treatment zone* — Device in the intermediate zone and possibly in thermal treatment zone for setting the tentering width according to shrinkage value.

5.3.3 *Device for Adjustment of Width in Delivery Zone* — Device in delivery zone which permits adjustment of fabric to desired width.

5.3.3.1 *Device for additional adjustment of width in delivery zone* — Device in delivery zone for setting tentering width according to shrinkage value (and also adjust it further with a view to reducing tension during disengagement process of fabric selvedges from chain).

5.3.4 *Width Indicator* — Device for reading distance between clips and pins of two chains, that is, device indicating the final width of fabric being processed through stenter.

5.3.5 *Fabric Feed* — Device used to introduce selvedges of fabric into clips (*see* **5.2.2.1**) or onto pin plate (*see* **5.2.1.1**).

5.4 Devices for Heating Air

5.4.1 *Air Filter* — Device to remove air-borne fibres from air recycled to driers.

5.4.2 *Heating Unit* — Source of heat enabling air blown onto fabric to be brought to required temperature.

5.4.3 *Circulation Fan* — Device allowing heated air to be blown onto fabric.

5.4.4 *Air Nozzle* — Device guiding direction of hot air on fabric.

5.4.5 *Exhaust Fan* — Device by means of which air charged with moisture or contaminants is blown out of drying system.

5.5 Devices for Guiding the Selvedges

5.5.1 *Selvedge Uncurler* — Device designed to open curled or creased selvedges of fabric.

5.5.2 *Selvedge Feeler* — Feeler used to detect position of selvedges of fabric.

5.5.2.1 *Mechanical selvedge feeler* — Selvedge feeler with spring loaded or gravity loaded lever feeler.

5.5.2.2 *Electrical selvedge feeler* — Selvedge feeler with electrically controlled feeler.

5.5.2.3 *Photo-electric selvedge feeler* — Selvedge feeler with light ray and photo-electric cell.

5.5.2.4 *Pneumatic selvedge feeler* — Selvedge feeler with jet of air.

5.5.3 *Over-feed Device* — Device for introducing fabric into stenter at a speed higher than that of chains.

5.5.4 *Edge Checker (Control of Clipping or Pinning Fail-safe or Knock-off Device)* — Safety device for stopping the machine when one or both the selvedges of fabric are not held by the clip/pins.

5.5.5 *Devices for Fabric Release*

5.5.5.1 *Clipping-off device* — Device effecting the release of the fabric selvedge from the clips (*see* **5.2.2.1**) in delivery zone.

5.5.5.2 *Pinning-off device* — Device effecting the release of the fabric selvedge from pins (*see* **5.2.1.1**) in delivery zone.

5.5.6 *Exit Guards (Control for Unclipping and De-pinning on Delivery)* — Safety device for stopping the machine if one or both selvedges of fabric are not released at exit.

5.6 Devices for Guiding Material Before and After Stenter Chain

5.6.1 *Guide Roller* — An idle roller designed to guide and support the fabric. The fabric movement causes the roller to rotate.

5.6.2 *Drive Roller* — Driven roller causing movement of fabric in desired direction.

5.6.3 *Spreading Roller* — Device to maintain fabric width, designed to prevent formation of creases, to eliminate creases and to uncurl selvedges during run.

5.6.4 *Return Roller* — Freely rotating roller enabling fabric passage in reverse direction.

5.6.5 *Devices for Weft Correction*

5.6.5.1 Devices for correcting linear and curved weft disorders.

5.6.5.1.1 Manually operated devices for correcting weft disorders.

5.6.5.1.2 Electrically operated devices for correcting weft disorders.

5.6.5.1.3 Fully automatic devices for correction of weft disorders working on photo-electric system.

5.7 Measuring Instruments

5.7.1 *Fabric Speed Indicators* — Instruments which indicate linear speed of fabric running into zones of stenter.

5.7.2 *Temperature Indicators* — Instruments which indicate temperature of air being circulated.

5.7.3 *Moisture Indicator/Controller* — Instrument to indicate moisture content of fabric and to control the same by automatic regulation of speed of stenter, if required.

NOTE — These instruments may be introduced into control system to regulate devices enabling a required degree of dryness corresponding to a predetermined moisture content to be obtained. They may also be used for the automatic recording of drying curves.